

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

United States Patent and Trademark
Office
(Box PCT)
Crystal Plaza 2
Washington, DC 20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing: 03 January 1997 (03.01.97)	
International application No.: PCT/JP96/01641	Applicant's or agent's file reference: FP-KS-0434
International filing date: 14 June 1996 (14.06.96)	Priority date: 14 June 1995 (14.06.95)
Applicant: HATADA, Yuji et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International preliminary Examining Authority on:
21 November 1996 (21.11.96)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer: J. Zahra
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 730.91.11

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference FP-KS-0434	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/JP 96/ 01641	International filing date (day/month/year) 14/06/1996	Priority date (day/month/year) 14/06/1995
International Patent Classification (IPC) or national classification and IPC C12N15/56		
Applicant KAO CORPORATION et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


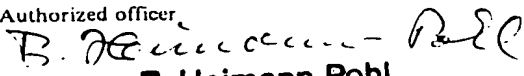
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consists of a total of 2 sheets.

3. This report contains indications and corresponding pages relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 21/11/1996	Date of completion of this report 10. 09. 97
Name and mailing address of the IPEA/  European Patent Office D-80298 Munich Tel. (+ 49-89) 2399-0, Tx: 523656 epmu d Fax: (+ 49-89) 2399-4465	Authorized officer  B. Heimann-Pohl Telephone No. 87-13

INTERNATIONAL PRELIMINARY EXAMINATION REPORT**I. Basis of the report**

1. This report has been drawn up on the basis of (Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.):

☐ the international application as originally filed.

☒ the description, pages 1-26 _____, as originally filed,
pages _____, filed with the demand,
pages _____, filed with the letter of _____,
pages _____, filed with the letter of _____.

☒ the claims, Nos. _____, as originally filed,
Nos. 1-13 _____, as amended under Article 19,
Nos. _____, filed with the demand,
Nos. _____, filed with the letter of _____,
Nos. _____, filed with the letter of _____.

☒ the drawings, sheets/fig 1/4-4/4 _____, as originally filed,
sheets/fig _____, filed with the demand,
sheets/fig _____, filed with the letter of _____,
sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

☐ the description, pages _____.
☐ the claims, Nos. _____.
☐ the drawings, sheets/fig _____.

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims 2, 3, 10-13_____	YES
	Claims 1, 4-9_____	NO
Inventive Step (IS)	Claims _____	YES
	Claims 2, 3, 10-13_____	NO
Industrial Applicability (IA)	Claims 1-13_____	YES
	Claims _____	NO

2. CITATIONS AND EXPLANATIONS

1). The present application relates to alkaline liquefying alpha-amylase activity, a DNA molecule encoding said protein, its cloning, hosts and a method for producing said protein.

2). D1 (WO,A,94 26881) discloses liquefying alpha-amylase from Bacillus sp. KSM-AP1378 (page 5). The protein was not sequenced and the corresponding DNA not cloned.

D2 (Biochemical and Biophysical Research Communications, vol.151, no.1, 1988, pages 25-31) discloses the cloning and sequence of an alkaline liquefying alpha-amylase from Bacillus sp. 707. The sequence of said amylase appears to be different from SEQ ID NO:1 or SEQ ID NO:2 of the present application.

D3 (Journal of Biochemistry, vol.98, no.5, 1985, pages 1147-1156) describes the cloning of an alkaline liquefying alpha-amylase from B. licheniformis. The sequence of

said enzyme is also given.

- 3). Claim 9 is not novel with regard to D1, because D1, to which the present application refers to on page 3, discloses the same protein as the one which is claimed in claim 9.

Claim 1 is not restricted to a specific sequence therefore the subject matter of claim 1 includes the sequences disclosed in D2 and D3.

Also claims 4-9 embrace the subject matter of D2 and D3.

Therefore the subject matter of claims 1, 4-9 is not novel (Art. 33 (2) PCT).

The subject matter of claims 2, 3 and 10-13 appears to be novel with regard to D1-D3.

- 4). Once a protein is known in the art, as it is the case for the protein of claim 9 with regard to D1, it does not require inventive skill to sequence said protein. From the amino acid sequence the nucleotide sequence can be deduced and the gene can be isolated and cloned without inventive skill.

As a consequence claims 2, 3, 10-13 lack an inventive step (Art. 33 (3) PCT).

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

Intern. application No.

PCT/JP69/01641

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

The internal denominations of the plasmid in claims 12 and 13 are meaningless to the skilled person, therefore these claims are unclear (Art. 6 PCT).

Claims

1. A DNA molecule encoding alkaline liquefying α -amylase activity.
2. A DNA molecule as defined in Claim 1, which encodes the amino acid sequence described in Sequence No. 1 or a functional fragment thereof.
3. A DNA molecule encoding a protein exhibiting alkaline liquefying α -amylase activity and possessing an amino acid sequence described in Sequence No. 1 in which one or more amino acids are substituted, added, deleted, inverted, or inserted.
4. A DNA molecule as defined in any one of Claims 1 through 3, further comprising a nucleotide sequence for regulating expression of a gene.
5. A recombinant DNA containing the DNA molecule of any one of Claims 1 through 4.
6. A transformed microorganism harboring the recombinant DNA of Claim 5.
7. A method for producing alkaline liquefying α -amylase, comprising culturing the transformed microorganism of Claim 6 and isolating the alkaline liquefying α -amylase produced by the microorganism.
8. A DNA molecule which hybridizes to a DNA sequence which is complementary to the nucleic acid sequence of SEQ ID No. 2.
9. A protein encoded by the DNA molecule of Claims 1 through 4.
10. A DNA molecule which hybridizes to a DNA sequence which is complementary to the nucleic acid sequence of SEQ ID No. 2, wherein said DNA molecule encodes a protein having alkaline

liquefying α -amylase activity.

11. A protein encoded by the DNA molecule of Claim 10.
12. The recombinant DNA plasmid pAML100.
13. The recombinant *E. coli* strain HB101(pAML100).

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REC'D 15 SEP 1997

WIPO

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Date of submission of the demand 21/11/1996	Date of completion of this report 10. 09. 97
Name and mailing address of the IPEA/  European Patent Office D-80298 Munich Tel. (+49-89) 2399-0, Tx: 523656 epmu d Fax: (+49-89) 2399-4465	Authorized officer <i>B. Heimann-Pohl</i> B. Heimann-Pohl Telephone No. 87-13

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Nos. _____, filed with the letter of _____,
Nos. _____, filed with the letter of _____.

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sheets/fig _____, filed with the demand,
sheets/fig _____, filed with the letter of _____,
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	Claims 1, 4-9_____	NO
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

Intern. application No.

PCT/JP69/01641

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Claims

1. A DNA molecule encoding alkaline liquefying α -amylase activity.
2. A DNA molecule as defined in Claim 1, which encodes the amino acid sequence described in Sequence No. 1 or a functional fragment thereof.
3. A DNA molecule encoding a protein exhibiting alkaline liquefying α -amylase activity and possessing an amino acid sequence described in Sequence No. 1 in which one or more amino acids are substituted, added, deleted, inverted, or inserted.
4. A DNA molecule as defined in any one of Claims 1 through 3, further comprising a nucleotide sequence for regulating expression of a gene.
5. A recombinant DNA containing the DNA molecule of any one of Claims 1 through 4.
6. A transformed microorganism harboring the recombinant DNA of Claim 5.
7. A method for producing alkaline liquefying α -amylase, comprising culturing the transformed microorganism of Claim 6 and isolating the alkaline liquefying α -amylase produced by the microorganism.
8. A DNA molecule which hybridizes to a DNA sequence which is complementary to the nucleic acid sequence of SEQ ID No. 2.
9. A protein encoded by the DNA molecule of Claim 9.
10. A DNA molecule which hybridizes to a DNA sequence which is complementary to the nucleic acid sequence of SEQ ID No. 2, wherein said DNA molecule encodes a protein having alkaline

Replaced by Article 34

liquefying α -amylase activity.

11. A protein encoded by the DNA molecule of Claim 11.
12. The recombinant DNA plasmid pAML100.
13. The recombinant *E. coli* strain HB101(pAML100).

Abstract

The present invention provides a DNA fragment encoding alkaline liquefying α -amylase, recombinant DNA containing the DNA fragment, a transformed microorganism harboring the recombinant DNA, as well as a method for producing alkaline liquefying α -amylase using the transformant. The method of the present invention enables mass production of alkaline liquefying α -amylase useful as a detergent component.

BUDAPEST TREATY ON THE INTERNATIONAL RECOGNITION OF THE DEPOSIT OF MICROORGANISMS FOR THE PURPOSES OF PATENT PROCEDURE

〔特許手続上の微生物の寄託の国際的承認に関するブダペスト条約〕

RECEIPT IN THE CASE OF AN ORIGINAL DEPOSIT

下記国際寄託当局によって規則 7. 1 に従い発行される

issued pursuant to Rule 7. 1 by the INTERNATIONAL DEPOSITARY AUTHORITY identified at the bottom of this page.

原寄託についての受託証

氏名 (名称)

森 啓

寄託者

殿

あて名

☎ 321-34

栃木県芳賀郡市貝町大字赤羽 2 6 0 6

I. 微生物の表示

(寄託者が付した識別のための表示)

Bacillus sp. KSM-API378

(受託番号)

微工研発寄第 3048 号

(FERM BP- 3048)

II. 科学的性質及び分類学上の位置

I 欄の微生物には、次の事項を記載した文書が添付されていた。

☒ 科学的性質

☒ 分類学上の位置

III. 受領及び受託

本国際寄託当局は、平成 元年 7 月 24 日 (原寄託日) に受領した I 欄の微生物を受託する。

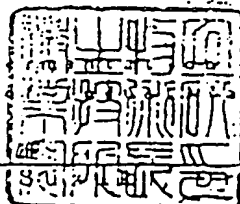
(平成 元年 7 月 24 日に寄託された微工研発寄第 P- 10886 号より移管)

IV. 国際寄託当局

通商産業省工業技術院微生物工業技術研究所

名称:

Agency



Research Institute

Science and Technology

所長

鈴木 哲

Tomoo

DIRECTOR GENERAL

あて名: 日本国茨城県つくば市東 1 丁目 1 番 3 号 (郵便番号 305)

1-3, Higashi 1 chome Tsukuba-shi Ibaraki-ken

305, JAPAN

平成 2 年 (1990) 3 月 8 日

PATENT COOPERATION TREATY

PCT

**NOTIFICATION CONCERNING
THE FILING OF AMENDMENTS OF THE CLAIMS**
(PCT Administrative Instructions, Section 417)

From the INTERNATIONAL BUREAU

To:

ARUGA, Mitsuyuki
Kyodo Building
3-6, Nihonbashiningyocho 1-chome
Chuo-ku
Tokyo 103
JAPON



Date of mailing (day/month/year) 13 December 1996 (13.12.96)	
Applicant's or agent's file reference FP-KS-0434	IMPORTANT NOTIFICATION
International application No. PCT/JP96/01641	International filing date (day/month/year) 14 June 1996 (14.06.96)
Applicant KAO CORPORATION et al	

1. The applicant is hereby notified that amendments to the claims under Article 19 were received by the International Bureau on:

11 December 1996 (11.12.96)

2. This date is within the time limit under Rule 46.1.

Consequently, the international publication of the international application will contain the amended claims according to Rule 48.2(f), (h) and (i).

3. The applicant is reminded that the international application (description, claims and drawings) may be amended during the international preliminary examination under Chapter II, according to Article 34, and in any case, before each of the designated Offices, according to Article 28 and Rule 52, or before each of the elected Offices, according to Article 41 and Rule 78.

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorised officer

K. Takeda

Telephone No.: (41-22) 730.91.11

Claims

1. A DNA molecule encoding alkaline liquefying α -amylase activity.
2. A DNA molecule as defined in Claim 1, which encodes the amino acid sequence described in Sequence No. 1 or a functional fragment thereof.
3. A DNA molecule encoding a protein exhibiting alkaline liquefying α -amylase activity and possessing an amino acid sequence described in Sequence No. 1 in which one or more amino acids are substituted, added, deleted, inverted, or inserted.
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5. A recombinant DNA containing the DNA molecule of any one of Claims 1 through 4.
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7. A method for producing alkaline liquefying α -amylase, comprising culturing the transformed microorganism of Claim 6 and isolating the alkaline liquefying α -amylase produced by the microorganism.
8. A DNA molecule which hybridizes to a DNA sequence which is complementary to the nucleic acid sequence of SEQ ID No. 2.
9. A protein encoded by the DNA molecule of Claims 1 through 4.
10. A DNA molecule which hybridizes to a DNA sequence which is complementary to the nucleic acid sequence of SEQ ID No. 2, wherein said DNA molecule encodes a protein having alkaline

liquefying α -amylase activity.

11. A protein encoded by the DNA molecule of Claim 10.
12. The recombinant DNA plasmid pAML100.
13. The recombinant *E. coli* strain HB101(pAML100).

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum) FP-KS-0434



Box No. I TITLE OF INVENTION

GENE ENCODING ALKALINE LIQUEFYING ALPHA-AMYLASE

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

Kao Corporation

14-10, Nihonbashikayabacho 1-chome,
Chuo-ku, Tokyo 103 Japan

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (i.e. country) of nationality: Japan

State (i.e. country) of residence: Japan

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

HATADA Yuji

c/o Kao Corporation, Research Laboratories,
2606, Akabane, Ichikai-machi, Haga-gun,
Tochigi 321-34 Japan

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality: Japan

State (i.e. country) of residence: Japan

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent ☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

6870 Patent Attorney, ARUGA Mitsuyuki

7756 Patent Attorney, TAKANO Toshio

9673 Patent Attorney, NAKAJIMA Toshio

10131 Patent Attorney, MATOBA Hiromi

all of Kyodo Bldg., 3-6, Nihonbashingyocho
1-chome, Chuo-ku, Tokyo 103 Japan

Telephone No.

03-3669-0904

Facsimile No.

03-3669-8610

Teleprinter No.

☐ Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANTS AND/OR (FURTHER) INVENTORS

If none of the following sub-boxes is used, this sheet is not to be included in the request.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

OZAKI Katsuya

c/o Kao Corporation, Research Laboratories,
2606, Akabane, Ichikai-machi, Haga-gun,
Tochigi 321-34 Japan

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality: Japan

State (i.e. country) of residence: Japan

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☐ all designated States except the United States of America

☒ the United States of America only

☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

ARA Katsutoshi

c/o Kao Corporation, Research Laboratories,
2606, Akabane, Ichikai-machi, Haga-gun,
Tochigi 321-34 Japan

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality: Japan

State (i.e. country) of residence: Japan

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☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

KAWAI Shuji

c/o Kao Corporation, Research Laboratories,
2606, Akabane, Ichikai-machi, Haga-gun,
Tochigi 321-34 Japan

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ITO Susumu

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Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

Regional Patent

- ☐ **AP ARIPO Patent:** KE Kenya, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, DE Germany, DK Denmark, ES Spain, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☐ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|---|---|
| <input type="checkbox"/> AM Armenia | <input type="checkbox"/> MD Republic of Moldova |
| <input type="checkbox"/> AT Austria | <input type="checkbox"/> MG Madagascar |
| <input type="checkbox"/> AU Australia | <input type="checkbox"/> MN Mongolia |
| <input type="checkbox"/> BB Barbados | <input type="checkbox"/> MW Malawi |
| <input type="checkbox"/> BG Bulgaria | <input type="checkbox"/> MX Mexico |
| <input type="checkbox"/> BR Brazil | <input type="checkbox"/> NO Norway |
| <input type="checkbox"/> BY Belarus | <input type="checkbox"/> NZ New Zealand |
| <input type="checkbox"/> CA Canada | <input type="checkbox"/> PL Poland |
| <input type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> CN China | <input type="checkbox"/> RO Romania |
| <input type="checkbox"/> CZ Czech Republic | <input type="checkbox"/> RU Russian Federation |
| <input type="checkbox"/> DE Germany | <input type="checkbox"/> SD Sudan |
| <input type="checkbox"/> DK Denmark | <input type="checkbox"/> SE Sweden |
| <input type="checkbox"/> EE Estonia | <input type="checkbox"/> SG Singapore |
| <input type="checkbox"/> ES Spain | <input type="checkbox"/> SI Slovenia |
| <input type="checkbox"/> FI Finland | <input type="checkbox"/> SK Slovakia |
| <input type="checkbox"/> GB United Kingdom | <input type="checkbox"/> TJ Tajikistan |
| <input type="checkbox"/> GE Georgia | <input type="checkbox"/> TM Turkmenistan |
| <input type="checkbox"/> HU Hungary | <input type="checkbox"/> TT Trinidad and Tobago |
| <input type="checkbox"/> IS Iceland | <input type="checkbox"/> UA Ukraine |
| <input type="checkbox"/> JP Japan | <input type="checkbox"/> UG Uganda |
| <input type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> US United States of America |
| <input type="checkbox"/> KG Kyrgyzstan | |
| <input type="checkbox"/> KP Democratic People's Republic of Korea | <input type="checkbox"/> UZ Uzbekistan |
| | <input type="checkbox"/> VN Viet Nam |
| <input type="checkbox"/> KR Republic of Korea | |
| <input type="checkbox"/> KZ Kazakhstan | |
| <input type="checkbox"/> LK Sri Lanka | |
| <input type="checkbox"/> LR Liberia | |
| <input type="checkbox"/> LT Lithuania | |
| <input type="checkbox"/> LU Luxembourg | |
| <input type="checkbox"/> LV Latvia | |

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

- ☐
- ☐
- ☐
- ☐

In addition to the designations made above, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except the designation(s) of
 The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIMFurther priority claims are indicated in the Supplemental Box ☐

The priority of the following earlier application(s) is hereby claimed:

Country (in which, or for which, the application was filed)	Filing Date (day/month/year)	Application No.	Office of filing (only for regional or international application)
item (1) Japan	14.06.95	Patent Application No. 7-147257	
item (2)			
item (3)			

Mark the following check-box if the certified copy of the earlier application is to be issued by the Office which for the purposes of the present international application is the receiving Office (a fee may be required):



The receiving Office is hereby requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s):

(1)

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) (If two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used): ISA / EP

Earlier search Fill in where a search (international, international-type or other) by the International Searching Authority has already been carried out or requested and the Authority is now requested to base the international search, to the extent possible, on the results of that earlier search. Identify such search or request either by reference to the relevant application (or the translation thereof) or by reference to the search request.

Country (or regional Office):

Date (day/month/year):

Number:

Box No. VIII CHECK LIST

This international application contains the following number of sheets:

1. request : 4 sheets
 2. description : 25 sheets
 3. claims : 2 sheets
 4. abstract : 1 sheets
 5. drawings : 4 sheets

Total : 36 sheets

This international application is accompanied by the item(s) marked below:

1. ☒ separate signed power of attorney
 2. ☐ copy of general power of attorney
 3. ☐ statement explaining lack of signature
 4. ☐ priority document(s) identified in Box No. VI as item(s):
 5. ☒ fee calculation sheet
 6. ☒ separate indications concerning deposited microorganisms
 7. ☐ nucleotide and/or amino acid sequence listing (diskette)
 8. ☐ other (specify) Request for transfer of Priority Document

Figure No. _____ of the drawings (if any) should accompany the abstract when it is published.

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

ARUGA Mitsuyuki

For receiving Office use only

1. Date of actual receipt of the purported international application:	2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	
4. Date of timely receipt of the required corrections under PCT Article 11(2):	
5. International Searching Authority specified by the applicant: ISA /	
6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid	

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

PCT

FEE CALCULATION SHEET

Annex to the Request

For receiving Office use only

International application No.

Date stamp of the receiving Office

Applicant's or agent's
file reference

FP-KS-0434

Applicant

Kao Corporation

CALCULATION OF PRESCRIBED FEES

1. TRANSMITTAL FEE 18,000 T

2. SEARCH FEE 169,000 S

International search to be carried out by

(If two or more International Searching Authorities are competent in relation to the international application, indicate the name of the Authority which is chosen to carry out the international search.)

3. INTERNATIONAL FEE

Basic Fee

The international application contains 36 sheets.

first 30 sheets 67,400 b₁

6 x 1,300 = 7,800 b₂
remaining sheets additional amount

Add amounts entered at b₁ and b₂

and enter total at B 75,200 B

Designation Fee

3 x 16,400 = 49,200 D
number of designations amount of designation fee

(If that total exceeds the figure which corresponds to the amount of the designation fee multiplied by ten, enter the latter figure in box D.)

Add amounts entered at B and D and enter total at I 124,400 I

4. FEE FOR PRIORITY DOCUMENT P

5. TOTAL FEES PAYABLE

Add amounts entered at T, S, I and P,
and enter total in the TOTAL box

311,400

TOTAL

☐ The designation fee is not paid at this time.

MODE OF PAYMENT

☐ authorization to charge
deposit account (see below)

☐ bank draft

☐ coupons

☐ cheque

☐ cash

☐ other (specify):

☐ postal money order

☐ revenue stamps

DEPOSIT ACCOUNT AUTHORIZATION (this mode of payment may not be available at all receiving Offices)

The RO/ ☐ is hereby authorized to charge the total fees indicated above to my deposit account.

☐ is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.

☐ is hereby authorized to charge the fee for preparation and transmittal of the priority document to the International Bureau of WIPO to my deposit account.

Deposit Account Number

Date (day/month/year)

Signature

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference FP-KS-0434	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/JP 96/ 01641	International filing date(<i>day/month/year</i>) 14/06/1996	(Earliest) Priority Date (<i>day/month/year</i>) 14/06/1995
Applicant KAO CORPORATION et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (see Box I).

2. ☐ Unity of invention is lacking (see Box II).

3. ☒ The international application contains disclosure of a nucleotide and/or amino acid sequence listing and the international search was carried out on the basis of the sequence listing

☐ filed with the international application.

☒ furnished by the applicant separately from the international application,

☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.

☐ Transcribed by this Authority

4. With regard to the title, ☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this International Search Report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is:

Figure No. _____ ☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☒ None of the figures.

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 C12N15/56 C12N9/28 C12N1/21 C12N15/70

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO,A,94.26881 (KAO CORP ;ARA KATSUTOSHI (JP); SAEKI KATSUHISA (JP); IGARASHI KAZU) 24 November 1994 cited in the application see the whole document & EP,A,0 670 367 (KAO CORPORATION)	1-13
X	BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS, vol. 151, no. 1, 29 February 1988, pages 25-31, XP000605386 TSUKAMOTO A. ET AL.: "Nucleotide sequence of the maltohexaose-producing amylase gene from alkalophilic Bacillus sp. #707 and structural similarity to liquefying type alpha-amylases."	1,3-11
A	see the whole document --- -/--	2,12,13

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

6 November 1996

Date of mailing of the international search report

15. 11. 96

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Mandl, B

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JOURNAL OF BIOCHEMISTRY, vol. 98, no. 5, 1985, pages 1147-1156, XP002017641 YUUKI T ET AL.: "Complete nucleotide sequence of a gene coding for heat- and pH-stable alpha-amylase of Bacillus licheniformis: Comparison of the amino acid sequences of three bacterial liquefying alpha-amylases deduced from the DNA sequences." ---	1,3-11
A	see the whole document ---	2,12,13
A	EP,A,0 410 498 (GIST BROCADES NV ;PLANT GENETIC SYSTEMS NV (BE)) 30 January 1991 see the whole document ---	3
P,X	WO,A,95 26397 (NOVONORDISK AS ;OUTTRUP HELLE (DK); BISGAARD FRANTZEN HENRIK (DK);) 5 October 1995 see the whole document -----	1,3-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP 96/01641

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A-9426881	24-11-94	CN-A- 1110058 EP-A- 0670367	11-10-95 06-09-95
EP-A-0410498	30-01-91	AU-B- 638263 AU-A- 5953890 CA-A- 2030554 CN-A- 1050220 WO-A- 9100353 JP-T- 4500756 US-A- 5364782	24-06-93 17-01-91 30-12-90 27-03-91 10-01-91 13-02-92 15-11-94
WO-A-9526397	05-10-95	AU-A- 2067795 ZA-A- 9502565	17-10-95 21-12-95